Taxonomic Support for CAPS

- Introducing the role of Pest Survey Identifiers
- Tips for ensuring adequate survey support

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Pest Survey Identifier Positions

- Support expanding CAPS efforts
- Provide liaison with (CSREES) National Plant Diagnostic Network (NPDN)

NAPIS

APHIS

Survey Identifier Locations

- Cornell U. – Pathology Identifier
- Kansas State U. - Pathology Identifier

- Michigan State U. - Botany Identifier

- U.C. Davis - Entomology Identifier
- U. Florida - Entomology Identifier

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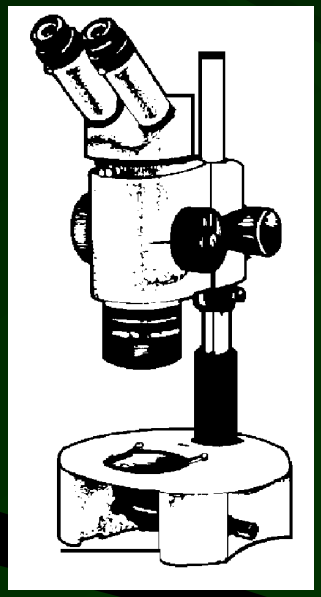
Identifier Duties

- Screens CAPS specimens & identifies target spp.
- Provides oversight & training for survey personnel with respect to their role in preliminary screening of survey samples
- Provides taxonomic support toward survey development as a member of national and regional teams; Serves as a consultant on survey procedures and technology

Survey Design

- Target pest(s)
- Survey tools
- Survey procedures
- Survey personnel
- Survey sites



Taxonomic support

Ensuring Taxonomic Support

First Consideration:

Can we recognize the target?

Consider ability to screen and confirm

Consult NIS (and CPHST for molecular ID)

Can We Recognize the Target

- What are the most similar endemic spp.?
- Are our procedures likely to capture similar endemic spp.?
- Do we expect to capture large nos. of similar endemics?
- Do screening personnel have access to reference specimens or images of the similar endemics?

Taxonomic Screening

- Identify the level of expertise required for reliable taxonomic screening:
  - Taxonomic specialists
  - Prepared general taxonomists (e.g. State diagnostic scientists; PPQ Identifiers)
  - Trained survey personnel

Screening by Specialists

- Formula for disaster:
  - Taxonomic specialist needed for screening
  - Large nos. of potential targets expected in survey samples (including similar endemics)
- Options for avoiding disaster. BEFORE survey:
  - Specialist trains sufficient nos. of general taxonomists
  - Methods development, e.g. simple molecular test; target-specific lure

Screening by Generalist Taxonomists

- State taxonomists & PPQ Identifiers
- Common practice in CAPS

- For success, ensure that:
  - Sufficient personnel for expected ID workload
  - Personnel are prepared for survey

Screening by Generalist Taxonomists

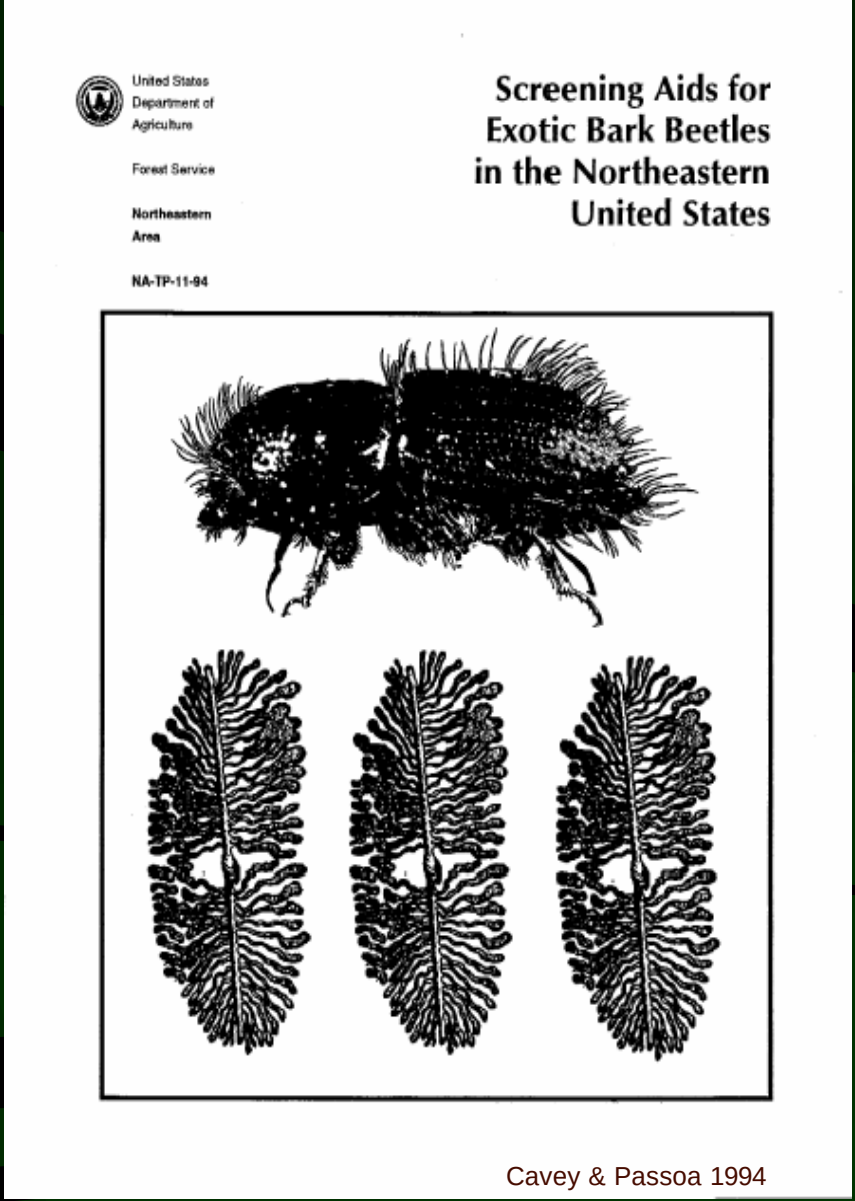
Preparation requires:

- Advance knowledge of survey plans
- Opportunity to review & provide input on sample collection & submission protocols
- Procuring references on and specimens of target spp. and similar endemics
- Learning to differentiate/recognize targets (may require direction from Specialists)

Preliminary Screening by Survey Personnel

- Preliminary screening essential for many large-scale surveys with similar endemics
- Preparation may require:
  - Training from taxonomists
  - Time for screening built into survey protocol
  - Tools for sorting specimens
  - Specimens or images of targets & similar spp.
  - Illustrated job aids

Screening Aids



Cavey & Passoa 1994

- Especially important for indistinct targets
- Regional scope may be necessary
- Modify existing keys or guides to local spp.
- Simple comparison to similar species

Detailed Screening Aid

Ips sexdentatus (Boerner) Screening Aid

(Subfamily Scolytinae, Tribe Ipini)

General Appearance in a Survey Sample. At 5.5-8.2 mm in length, *I. sexdentatus* would be one of the largest scolytids found in a survey sample from the north[illegible] U.S. This brown species has an excavate[illegible] Viewed from above, erect yellow hairs prot[illegible]

General Appearance

Recognizing the Genus. In general, *Ips* differs from other North American scolytids in having the following combination of characters (from Wood 1982, 1986):

- ❑ Elytral declivity widely excavated and armed laterally with 3 or more teeth, the teeth arising from the summit (ridge) of the lateral margins.
- ❑ Pronotum asperate on the anterior half.
- ❑ Antennal funicle 5-segmented.
- ❑ Antennal club strongly flattened, with two sutures on the anterior face bisinuate or procurved (curved forward).

Genus

Members of the most similar genera, *Orthotomicus* and *Acanthotomicus*, are much smaller in size than *I. sexdentatus*.

Recognizing *I. sexdentatus*. This species is named for the six spines or teeth found on each lateral margin of the elytral declivity (Fig. 3). Of the U.S. *Ips* that have more than four spines on the declivity, only *grandicollis* (with 5 spines, the 3rd spine largest) and *calligraphus* (with 6 spines) occur in the NER (Wood 1982, Lanier 1987, Lanier *et al.* 1991). Both species could be present in numbers in survey samples.

Target sp.

The following will separate the target exotic species from *I. calligraphus*:

I. sexdentatus	*I. calligraphus*
larger 5.5-8.2 mm (Grune 1979).	smaller 3.8-5.9 mm (Wood 1982).
4th declivital spine largest (Fig. 3) (Grune 1979).	3rd declivital spine largest (Fig. 4) (Wood 1982).
frons with a short, transverse raised line above median tubercle (Fig. 1).	frons without a raised line above median tubercle (Fig. 2) (Wood 1982).

In addition to those cited above, other characters were noted from a limited study of 60 or more specimens of *I. sexdentatus* and about 175 *I. calligraphus* from the U.S. National Museum and Baltimore PPQ insect collections. Most useful is the frontal ridge shown in Figure 1 and described above. Also unlike *I. calligraphus*, *I. sexdentatus* has a series of setate granules in line near the suture on each elytron, but restricted to the basal half of the declivity; and the antebasal area of the pronotum is usually impunctate near the middle. On *I. calligraphus*, the setate granules near the suture are numerous and continuous to the declivital apex, so that the midline of the declivity appears entirely fuzzy. (However, be careful, because hairs can be abraded.) On *I. calligraphus*, the antebasal area of the pronotum is sparsely, finely punctate near the middle.

Figure 1. *Ips sexdentatus*, frontal view of head (modified from Wood 1982).

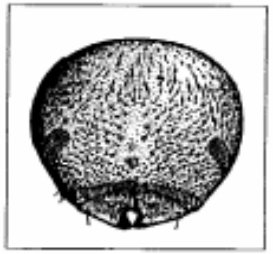


Figure 2. *Ips calligraphus*, frontal view of head (from Wood 1982).

Figure 3. *Ips sexdentatus*, lateral view of elytral declivity.

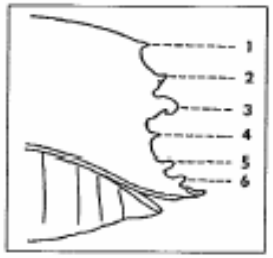


Figure 4. *Ips calligraphus*, lateral view of elytral declivity with teeth numbered (from Wood 1982).

Asian Longhorned Beetle vs. Cottonwood Borer

Asian Longhorned Beetle
Anoplophora glabripennis (Motschulsky)

Hosts: Prefers maple species; also infests horsechestnut, elms, birches, willows, and poplars. Attacks the upper tree crown initially, then larger branches and the main

Cottonwood Borer
Plectrodera scalator (Fabricius)

Hosts: Prefers eastern cottonwood; also infests other poplars and willows. Attacks the root collar and main roots of young trees.

Comparison to Similar Endemic

Recommendations

- Explicitly address taxonomic support in all CAPS survey proposals

- State & Regional CAPS Committees should have one member or reviewer knowledgeable of taxonomic needs for developing & reviewing survey proposals (e.g. Pest Survey Identifier or State taxonomist)